We claim:

1. An apparatus comprising:

- a movable member having a magnetically permeable portion contained therein for providing a magnetic flux path therethrough, a first side and an opposing second side, said second side including an outer bearing surface formed thereon;
- a fixed member for movably supporting the movable member with respect thereto, said fixed member comprising a bearing seat for receiving the outer bearing surface therein and for movably supporting said movable member with said first and said second sides accessible from opposing sides of the fixed member;
- a magnetic element fixedly attached to said movable member and movable therewith;
- a magnetically permeable stator element fixedly attached to said fixed member and positioned within a magnetic flux field of said magnetic element such that an air gap is formed therebetween, thereby providing a magnetic traction force acting across the air gap for urging the moving element toward the fixed element; and,
- at least one stator current coil wound onto a portion of the stator element for inducing an electromagnetic force within the stator element in response to a current passing therethrough, said electromagnetic force acting on the magnetic element.

2. The apparatus of claim 1 wherein the bearing surface of the movable member and the bearing seat of the fixed member have a coefficient of friction and wherein said magnetic tractive force in combination with the coefficient of friction provides a clamping force for urging the bearing surface into contact with the bearing seat with sufficient force magnitude that the clamping force holds the movable member in a stationary orientation with respect to the fixed member during normal operation of the apparatus.

3. An apparatus according to claim 2 further comprising a current driving circuit connected with the at least one stator current coil for providing a current to the at least one coil such that the electromagnetic force generated in the stator element has a direction and a magnitude for one of, increasing and decreasing a magnitude of said clamping force.

4. An apparatus according to claim 3 wherein the current driver circuit further provides current to the at least one coil such that the electromagnetic force generated by the coil current in the stator element with a direction and a magnitude sufficient for rotating the movable member about at least one rotational axis.

5. An apparatus according to claim 1 wherein the movable member comprises an outer spherical bearing surface on said second side and wherein the fixed member comprises an inner spherical bearing raceway for receiving the outer spherical bearing surface therein such that the movable member is supported for rotation with respect to the fixed member and wherein the stator element is configured to provide mutually perpendicular electromagnetic forces in response to drive currents in the at least one stator coil, said provide mutually perpendicular electromagnetic forces providing mutually perpendicular rotations of the movable member for orienting the first side at a desired orientation.

6. The apparatus according to claim 5 wherein the movable member further comprises a mirrored surface formed on said first side thereof for reflecting incident radiation therefrom.

7. An apparatus according to claim 1 wherein the movable member comprises an outer cylindrical bearing surface on said second side the cylindrical bearing surface being formed about a longitudinal axis of the movable member and wherein the fixed member comprises an inner cylindrical bearing raceway for receiving the cylindrical bearing surface therein such that the movable member is rotatable about the longitudinal axis for a single axis rotation with respect to the fixed member.

8. An apparatus according to claim 7 wherein the movable member further comprises a mirrored surface formed on said first side thereof for reflecting incident radiation therefrom.

9. An apparatus according to claim 4 wherein the first side of the movable member comprises a platform for supporting an element for controlled movement thereof.

10. An apparatus according to claim 1 further comprising means for determining an orientation of the movable member (10) with respect to a reference orientation.

11. An apparatus according to claim 4, further comprising means for providing an electrical signal representative of an orientation of the movable member (10) with respect to a reference orientation, said electrical signal being communicated to the current driver circuit for determining said direction and said magnitude for rotating said movable member.

12. A method for supporting a movable member comprising the steps of:

- forming the movable member with a first side and an opposing second side having an outer bearing surface formed thereon, said movable member further providing a magnetic flux path passing therethrough;
- supporting the movable member by a fixed member, said fixed member comprising a bearing seat for receiving the outer bearing surface therein the fixed member being formed to provide access to the movable member first and said second sides from opposing sides of the fixed member;
- fixedly attaching a magnetic element to the movable member for movement therewith;
- generating a magnetic traction force for urging the moving element toward the fixed member by fixedly attaching a magnetically permeable stator element to the fixed member within a magnetic flux field of the magnetic element such that an air gap is formed between the magnetic element and the stator element; and,
- winding a stator current coil onto a portion of the stator element for inducing an electromagnetic force within the stator element in response to a current passing therethrough, said electromagnetic force acting on the magnetic element.

13. A method according to claim 12 further comprising the steps of:

- providing a desired coefficient of friction between the bearing surface and the bearing seat; and,
- selecting the magnetic tractive force to act in combination with the coefficient of friction to provide sufficient force magnitude for clamping the movable member in a stationary orientation with respect to the fixed member under normal operating conditions.

14. A method according to claim 13 further comprising the step of driving a current to the at least one stator current coil sufficient for generating the electromagnetic force in the stator element with a direction and a magnitude sufficient for one of, increasing and decreasing a magnitude of said clamping force.

15. A method according to claim 13 further comprising the step of driving a current to the at least one stator current coil sufficient for generating the electromagnetic force in the stator element with a direction and a magnitude sufficient for rotating the movable member with respect to the fixed member.

16. A method according to claim 15, further comprising the steps of :

- determining an actual orientation of the movable member with respect to a reference orientation; and,
- generating an electrical signal representative of the actual orientation.

17. A method according to claim 16, further comprising the step of using the electrical signal representative of the actual orientation for determining said direction and said magnitude for rotating said movable member with respect to said fixed member for achieving a desired orientation with respect to said reference orientation.